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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,443	11/07/2001	J. Craig Raese	10011455-1	4173

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER

GIESY, ADAM

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/046,443

Applicant(s)

RAESE, J. CRAIG

Examiner

Adam R. Giesy

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/07/2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 10-12, and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Pfeiffer (US Pat. No. 4,423,305).

Pfeiffer incorporates by reference, Pfeiffer et al. (Pfeiffer-1 – US Pat. No. 3,894,271).

Regarding claim 1, Pfeiffer discloses a method for controlling the voltage on a lens of an electron emitting device, the method comprising the steps of: supplying an emitter voltage to an electron emitter in the electron emitting device (see column 3, lines 39-46 – supplying a voltage to the source is inherent to the source, as the source is emitting electrons. Applying a voltage through the described filament to excite the electrons is a fundamental way to excite the electrons), wherein a current amplitude is established (see column 4, lines 46-48 – Pfeiffer discloses that the source creates a current, the amplitude is inherent to any given current); sensing the emitter voltage on the electron emitter (sensing plates – column 5, lines 58-66); supplying a non-inverted input voltage to an amplifier that follows the emitter voltage (implemented in Pfeiffer, but shown in Pfeiffer-1 – for circuit, see Pfeiffer-1 Figure 4, elements 34 and 43); and providing an amplifier output voltage from the amplifier to the lens, wherein the amplifier output voltage corresponds to the emitter voltage at the electron emitter (see column 6, lines 51-60).

Regarding claim 2, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above and further that other lenses (column 4, lines 23-38) are driven in the emitting device based on the amplifier output voltage supplied by the amplifier (column 6, lines 51-60).

Regarding claim 3, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above and further that the lens (which is adjusted by the amplifier as discussed in the claim 1 rejection above) is used to control the path of the electron beam (see 'corresponds to a centered source image' - column 6, lines 51-60).

Regarding claim 4, Pfeiffer discloses all of the limitations of claim 3 as discussed in the claim 3 rejection above and further that amplifier output voltage is adjusted by varying the gain of the amplifier (see Pfeiffer-1 Figure 4, element 43 – the gain of amplifier is determined by the input of element 34, and therefore the output is varied by the input).

Regarding claim 5, Pfeiffer discloses all of the limitations of claim 4 as discussed in the claim 4 rejection above and further that the gain is varied by a variable resistor coupled to the amplifier (see 'potentiometer' – column 6, line 53).

Regarding claim 6, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above and further that the sensing step is performed by a sensing diode (the sensing plate is acting as a sensor for the current/voltage of the beam from the emitter, and thusly is performing the same function).

Regarding claim 7, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above and further that the sensing step is performed by an electric switch (the sensing plate is acting as a sensor for the current/voltage of the beam from the emitter, and thusly

is functioning in the same fashion as an electric switch. See Pfeiffer-1 Figure 2, elements 32, 34, and 35 – the electrons interact between layers 32 and 34 which are separated by an insulating layer 35, and thus the configuration acts as a switch).

Regarding claim 8, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above and further that the sensing step is performed by one or more high-breakdown voltage MOS transistors (the sensing plate is acting as a sensor for the current/voltage of the beam from the emitter, and thusly is performing the same function).

Regarding claim 10, Pfeiffer discloses a storage device comprising: an electron emitter ('element 10' - column 3, lines 45 and 46); a lens to adjust the focal point of a beam emitted from the electron emitter ('element 18' - column 4, lines 1-5); a sensing switch coupled to the electron emitter to sense voltage on the electron emitter (see 'sensing plate 36' – column 5, lines 58-66); an amplifier coupled to the sensing switch that follows the voltage on the electron emitter, wherein the sensing switch is coupled to an input of the amplifier and the output of the amplifier is coupled to the lens; and wherein the output of the amplifier drives the voltage on the lens(see Pfeiffer-1 Figure 5 elements 34 and 37 as incorporated by reference).

Regarding claim 11, Pfeiffer discloses all of the limitations of claim 10 as discussed in the claim 10 rejection above and further that a variable resistor is coupled to an input of the amplifier, wherein the gain of the amplifier is adjusted according to the variable resistor (see 'potentiometer' – column 6, line 53).

Regarding claim 12, Pfeiffer discloses all of the limitations of claim 10 as discussed in the claim 10 rejection above and further that the sensing switch is a sensing diode (the sensing

plate is acting as a sensor for the current/voltage of the beam from the emitter, and thusly is performing the same function).

Regarding claim 15, Pfeiffer discloses all of the limitations of claim 10 as discussed in the claim 10 rejection above and further that an emitter current switch (see column 4, lines 45-50); and a current control circuit (shown in Pfeiffer-1 Figure 2, element 39) coupled to the sensing switch ('sensing plate 36' - column 5, lines 58-66), emitter current control switch (column 4, lines 45-50), and the variable resistor ('potentiometer 44' - column 6, line 52), wherein the current control circuit establishes the current amplitude supplied to the electron emitter (see column 4, lines 39-50).

Regarding claim 16, Pfeiffer discloses an electron emitting storage device comprising: emitter means for emitting electrons toward a storage medium (see column 3, lines 39-46); lens means for focusing emitted electrons from the emitter means into an optimized focal point on the storage medium (column 4, lines 23-38); means for sensing voltage applied to the emitter means (sensing plates - column 5, lines 58-66); amplifier means for providing an output voltage to the lens means that is relative to the voltage applied to the emitter means (implemented in Pfeiffer, but shown in Pfeiffer-1, see Pfeiffer-1 Figure 4, elements 34 and 43); and means for adjusting input voltage to the amplifier means so that the output voltage to the lens means changes (column 6, lines 51-60).

Regarding claim 17, Pfeiffer discloses all of the limitations of claim 16 as discussed in the claim 16 rejection above and further that means for controlling the current in the emitter means (aperture 27 - see column 5, lines 61-66); and switching means for activating the emitter means (shown in Pfeiffer-1, see Pfeiffer-1 Figure 2, element 14).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 9 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfeiffer (US Pat. No. 4,423,305) in view of Notte, IV (Notte – US Pat No. 6,515,287 B2).

Regarding claim 9, Pfeiffer discloses all of the limitations of claim 1 as discussed in the claim 1 rejection above. Pfeiffer does not disclose that the amplifier is a non-inverting summer circuit that sums the emitter voltage and a desired lens voltage.

Notte discloses a magnetic lens which can be used to alter the direction of a charged particle beam with an non-inverting op amp (Figure 5, element 108) that sums the emitter voltage (sensed from the magnetic field using elements 98 and 104) and the lens voltage (106).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the beam emitter as disclosed by Pfeiffer with the magnetic lens and amplifier circuit as disclosed Notte, the motivation being in order to more accurately control the direction of the electron beam.

Regarding claim 18, Pfeiffer discloses all of the limitations of claim 16 as discussed in the claim 16 rejection above. Pfeiffer does not disclose that the amplifier means is in a non-inverting configuration.

Notte discloses a magnetic lens which can be used to alter the direction of a charged particle beam with an non-inverting op amp (Figure 5, element 108).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the beam emitter as disclosed by Pfeiffer with the magnetic lens and amplifier circuit as disclosed Notte, the motivation being in order to more accurately control the direction of the electron beam.

Regarding claim 19, Pfeiffer discloses a method for controlling an electron emitting device the method comprising the steps of: supplying the emitter voltage on the electron emitter (see column 3, lines 39-46 – supplying a voltage to the source is inherent to the source, as the source is emitting electrons. Applying a voltage through the described filament to excite the electrons is a fundamental way to excite the electrons). Pfeiffer does not disclose the steps of summing the sensed emitter voltage and a desired lens voltage; and providing a voltage output that is the sum of the emitter voltage and the desired lens voltage to the lens of the electron emitting device.

Notte discloses a magnetic lens which can be used to alter the direction of a charged particle beam in which the sensed voltage and the lens voltage are summed (see Figure 5, elements 98, 104, 106, and 108). The op amp cited above output this signal (see output of element 108).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the beam emitter as disclosed by Pfeiffer with the magnetic lens and amplifier circuit as disclosed Notte, the motivation being in order to create a more accurate method of control while controlling the electron beam.

Regarding claim 20, Pfeiffer and Notte disclose all of the limitations of claim 19 as discussed in the claim 19 rejection above. Pfeiffer further discloses the step of driving other

lenses (column 4, lines 23-38) in the emitting device based on the provided voltage output (column 6, lines 51-60).

Allowable Subject Matter

5. Claims 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 13 is allowable over prior art of record which does not disclose or suggest all of the limitations of claim 12 as well as the further limitation that there is a **plurality of additional sensing diodes coupled to the input of the amplifier and other electron emitters.**

Claim 14 is allowable over prior art of record which does not disclose or suggest all of the limitations of claim 12 as well as the further limitation that **a compensating diode is coupled to the sensing diode and the amplifier, wherein the compensating diode compensates for a voltage drop across the sensing diode; and a bias resistor coupled to the amplifier side of the compensating diode and the ground.**

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Abe (US Pat. No. 6,797,965 B2) discloses a charged particle beam apparatus with lens control.

b. Marshall (US Doc. No. 2004/0213128) discloses a beam deflector for a data storage device.

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c. Naberhuis et al. (US Pat. No. 6,872,964 B2) discloses a data storage device using an electron emitter.


d. Naberhuis et al. (US Pat. No. 6,643,248 B2) discloses a data storage device using an electron emitter that concentrates on the lens voltage.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam R. Giesy whose telephone number is (571) 272-7555. The examiner can normally be reached on 8:00am- 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ARG 3/30/2005



W. R. YOUNG
PRIMARY EXAMINER